DOCUMENT RESUME

ED 244 812 SE 044 537

AUTHOR DeBlasi, Robert; Sousa, David A.
TITLE A Survey of Science Teaching in the Elementary Schools of New Jersey, 1983-1984.
INSTITUTION New Jersey Science Supervisors Association.
PUB DATE May 84
NOTE 19p.; For the three publications listed in this document see ED 229 279-280 and ED 219 284.
AVAILABLE FROM Mr. Elmer Dey, NJSSA, Randolph High School, Randolph, NJ 07869 ($3.50).
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Budgets; Elementary Education; *Elementary School Science; Elementary School Teachers; Enrichment Activities; School Safety; *Science Activities; *Science Curriculum; Science Education; *Science Instruction; *Science Programs; Science Teachers; *State Surveys; Textbooks
IDENTIFIERS *New Jersey

ABSTRACT

Questionnaires were sent to 2,000 public and independent elementary, middle, and junior high schools in New Jersey to determine the status of K-8 science teaching. Survey results (with 21 percent response) are reported for: organization (grade ranges, school location, total number of elementary teachers, number of elementary teachers teaching science, and number of teachers teaching science related to school organization); program (type of science program, textbooks used, and textbook updating); financing and budgeting; time and scheduling; science laboratory activities; science enrichment activities; safety; full- or part-time science resource person; and miscellaneous categories (computer availability, availability of time and/or finances for teacher to attend meetings, in-house science facilities; and problems adversely affecting the science curriculum). Among the findings highlighted are: (1) nearly 84 percent of science taught took place in self-contained classrooms; (2) a text-centered program, using inquiry and discovery methods, was the dominant type of program at each K-8 grade level; (3) texts are updated every 5 to 6 years; (4) over 80 percent of the schools reported using laboratory activities; and (5) more than half of all schools noted that their boards of education or trustees had not adopted a formal policy on science safety. (JN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED244812

NEW JERSEY SCIENCE SUPERVISORS ASSOCIATION

Affiliated with
NATIONAL SCIENCE SUPERVISORS ASSOCIATION
and
NEW JERSEY SCIENCE TEACHERS ASSOCIATION

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

A SURVEY OF SCIENCE TEACHING IN THE ELEMENTARY SCHOOLS OF NEW JERSEY

MAY 1984

njssa

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Mary Ann Hull
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE044537

Copyright © 1984 New Jersey Science Supervisors Association

NEW JERSEY SCIENCE SUPERVISORS ASSOCIATION

Affiliated with
NATIONAL SCIENCE
SUPERVISORS ASSOCIATION
and
NEW JERSEY
SCIENCE TEACHERS ASSOCIATION

A SURVEY OF SCIENCE TEACHING IN THE ELEMENTARY SCHOOLS OF NEW JERSEY 1983-1984

Report Written

by

Dr. David A. Sousa
Special Projects Chairperson, NJSSA
Director of Science
West Orange Public Schools
West Orange, New Jersey 07052

Data Compiled

by

Mrs. Mary Ann Hull
Science Department Chairperson
Scotch Plains-Fanwood High School
Scotch Plains, New Jersey 07076

Copyright © 1984 New Jersey Science Supervisors Association

THIS SURVEY IS WRITTEN BY A SPECIAL COMMITTEE OF THE
NEW JERSEY SCIENCE SUPERVISORS ASSOCIATION

PRINCIPAL AUTHOR

Mr. Robert DeBlasi
Senior Consultant
Paramus Public Schools

OTHER CONTRIBUTORS

Mr. Elmer Dey
Science Supervisor
Randolph High School

Mrs. Mary Ann Hull
Science Department Chairperson
Scotch Plains-Fanwood High School

Mrs. Trudy Iwanski
Science Supervisor
Hopewell Valley Central High School

Mr. Kurt Weinheimer
Assistant Principal
Scotch Plains-Fanwood High School

Dr. Doris White
Professor of Science Education
William Paterson College

THIS PROJECT WAS DIRECTED AND FUNDED ENTIRELY BY THE
NEW JERSEY SCIENCE SUPERVISORS ASSOCIATION, INC.

Randolph High School
Randolph, New Jersey

1983-84 OFFICERS

Elmer Dey, President — Trudy Iwanski, President-elect

Mary Ann Hull, Past President — Kurt Weinheimer, Secretary-Treasurer

OTHER PUBLICATIONS

of the

NEW JERSEY SCIENCE SUPERVISORS ASSOCIATION

A Survey of Accidents in the Secondary Schools Science Laboratory, 1983

Professional Improvement Plans in Science, 1983

A Survey of Science Teaching in the Secondary Schools of New Jersey, 1981-82, 1982

These spiral-bound publications can be obtained for $3.50 each by writing to:

Mr. Elmer Dey
NJSSA
Randolph High School
Randolph, New Jersey 07869

TABLE OF CONTENTS

	Page
Introduction	1
Summary Highlights	2
Number of Schools Responding by County (Map)	5
The Sample	6
Survey Results	6
I. Organization	6
II. Program	7
III. Financing/Budgeting	10
IV. Time and Scheduling	10
V. Science Laboratory Activities	10
VI. Science Enrichment Activities	11
VII. Safety	11
VIII. Full or Part-time Science Resource Person	11
IX. Miscellaneous	12

INTRODUCTION

Recent national studies have revealed that the weakest part of the science curriculum continues to be at the elementary school level. The studies have noted dramatic declines in both the amount of time devoted to teaching science and in the use of hands-on activities. Pressure to increase the teaching time in reading and mathematics is often cited as the main cause for the de-emphasis in science. Yet, research tells us that student attitudes about science are usually formed in grades five and six; thus, a weak or uninteresting elementary program often turns students away from science in the upper grades. To counter these trends, elementary science programs need to be continually evaluated and upgraded to provide a well-integrated and logically-articulated curriculum that is challenging and interesting.

This survey is an attempt to examine the status of elementary science in the public and independent schools of New Jersey. It is the fifth in a series of surveys conducted over the past sixteen years. The first four surveys covered only secondary schools and were published in 1969, 1974, 1978, and in 1982.

The data here represent the responses from 16.6% of all the accredited public and independent elementary, middle, and junior high schools in New Jersey. Since all questions were not answered on every survey, the results, wherever possible, have been summarized as percentages of total responses to each item.

The New Jersey Science Supervisors Association (NJSSA) expresses its thanks to the administrators, supervisors, and teachers who took the time to respond to the survey. It is our continued hope that information of this type will be helpful in efforts to improve science education in New Jersey. A special note of thanks goes to the science homeroom students at Scotch Plains-Fanwood High School who assisted in preparing the survey for mailing.

David A. Sousa, Ed.D.
Special Projects Chairperson
NJSSA

May 1984

SUMMARY HIGHLIGHTS OF THE 1984 SURVEY OF SCIENCE TEACHING IN THE ELEMENTARY SCHOOLS OF NEW JERSEY

RESPONSE SAMPLE

- - - The surveys returned came largely from public K-6 and K-8 elementary schools in suburban areas located in the northeastern and central parts of the state.

FORMAT FOR TEACHING SCIENCE

- - - Nearly 84% of the science taught in the responding schools took place in in self-contained classrooms.

- - - Less than 8% of science was taught by a science specialist.

PROGRAM

- - - A text-centered program, using inquiry and discovery methods, was the dominant type of program at each grade level, K through 8.

- - - The most frequently used science texts were:

Concepts in Science, Harcourt Brace Jovanovich

Holt Elementary Science, Holt, Rinehart and Winston

Accent on Science, Charles E. Merrill

- - - Text books are updated every 5 to 6 years.

SCIENCE BUDGET

- - - The average per-pupil expenditure for science equipment and supplies ranged from 66¢ to $2.14 in the public schools. Over 40% of the public schools reported that the amount spent on science supplies had remained the same over the past three years.

TIME TEACHING SCIENCE

- - - In public schools the average number of minutes per week of science teaching ranged from 29 minutes in kindergarten to 212 in grade eight. Except in kindergarten, independent schools spent 19-43% less time teaching science. In both cases the average times were below the nationally recommended times of 50 minutes per week in kindergarten to 225 in grade eight.

SCIENCE LABORATORY ACTIVITIES

- - - Over 80% of the responding schools reported using laboratory activities in their program. More than half of these schools use the activities at least once a week. There was no significant difference in the data between public and independent schools.

SCIENCE ENRICHMENT ACTIVITIES

- - - Museum trips, guest speakers, and visits to the zoo were the three most common types of enrichment activities for both the public and the independent schools.

SAFETY

- - - Over 65% of the public schools and nearly 83% of the independent schools reported there was no formal instructional program in science safety for the staff.

- - - Nearly 30% of the public and over 45% of the independent schools had no safety instructional program for students.

- - - More than half of all schools noted that their boards of education or trustees had not adopted a formal policy on science safety.

SCIENCE RESOURCE PERSON

- - - Only 43% of the public and 29% of the independent schools had a full or part-time science resource person available in the district or school.

CONVENTION/WORKSHOP ATTENDANCE

- - - Over 90% of the schools allowed their teachers to attend professional meetings, such as conventions, seminars and workshops.
- - - Over 70% of the schools reimbursed the attendees for all or nearly all of their meeting expenses.

PROBLEMS AFFECTING SCIENCE PROGRAM

- - - For public schools, over 59% listed the overemphasis on other subject areas and the lack of science specialists as the two major problems adversely affecting their science programs.
- - - In the independent schools, nearly 74% cited the lack of adequate facilities and the lack of science specialists as their two most important problems.

NUMBER OF SCHOOLS RESPONDING BY COUNTY

THE SAMPLE

Survey questionnaires were mailed in November 1983 to 2000 of the 2525 public and independent elementary, middle, and junior high schools in New Jersey. The survey asked about the science program in kindergarten through grade eight only. Twenty-one percent of the schools responded as follows: (See also the map on page 5 for the responses by county.)

Surveys Mailed Out		2,000
Surveys Received: Public	391	
Independent. .	29	420
Percentage of Mailing Returned		21.0%
Percentage of the Total 2525 Schools		16.6%

SURVEY RESULTS

I. ORGANIZATION

A. Grade Ranges

Number of Responding Schools Having the Grade Range Indicated (Total = 420)

K only	14	1-3	1	4-6	8
K-1	3	1-4	2	4-7	1
K-2	3	1-5	2	4-8	7
K-3	16	1-6	3	5-6	1
K-4	22	1-8	7	5-7	1
K-5	55	2-6	6	5-8	12
K-6	99	3-4	1	6-7	1
K-7	5	3-5	1	6-8	30
K-8	84	4-5	2	7-8	33

B. Location - Percentage of Schools in Each Area

	Urban	Suburban	Rural	TOTAL
Public	16.2%	69.6%	14.2%	100.0%
Independent	11.5%	88.5%	0	100.0%

C. Total Number of Elementary Teachers

Public	9,160	95.7% of sample
Independent	413	4.3%
TOTAL	9,573	100.0%

D. Number of Elementary Teachers Teaching Science

Public 5,612 or 61.3% of 9,160 Total

Independent 249 or 60.3% of 413 Total

E. Number of Teachers Teaching Science in Each Category

Category	Public	%	Independent	%
Self-contained classrooms	4,708	83.9	201	80.7
Science teaching specialists	397	7.1	26	10.4
Team teachers	389	6.9	10	4.0
Other	118	2.1	12	4.9
TOTAL	5,612	100.0	249	100.0

II. PROGRAM

A. Type of Science Program in the School: Number and percentage of schools with each program

	Primary (K-2)				Intermediate (3-5)				Upper (6-8)			
	Public		Independ.		Public		Independ.		Public		Independ.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1. Non-text: (inquiry/discovery, activity centered)	97	27.0	8	28.6	39	10.4	3	10.4	41	10.9	2	6.9
2. Text-centered: (inquiry/discovery, activity centered)	126	35.1	9	32.2	167	44.7	12	41.5	170	45.3	12	41.4
3. Text-centered: (traditional content approach	70	19.5	8	28.6	102	27.3	11	37.9	85	22.7	13	44.8
4. Other	12	3.3	2	7.1	12	3.2	1	3.4	17	4.5	0	0
5. Inquiry/discovery, activity centered program as ESS, SCIS, SAPA, ISIS, etc.	54	15.1	1	3.5	54	14.4	2	6.8	62	16.6	2	6.9
TOTALS	359	100.0	28	100.0	374	100.0	29	100.0	375	100.0	29	100.0

6. Text-centered: Number of schools using the text in their science program.

	Primary (K-2)		Inter. (3-5)		Upper (6-8)	
	Public	Ind.	Public	Ind.	Public	Ind.
a. ALLYN & BACON						
1. Exploring Life Science	2	1	0	0	4	0
2. Exploring Earth Science	0	1	2	0	4	0
3. Exploring Physical Science	0	0	0	0	4	0
b. CEBCO STANDARD PUBLISHING						
1. Concepts & Challenges Series	0	0	1	0	15	0
c. GINN AND COMPANY						
1. Elementary Series	7	1	11	2	7	0
d. GLC/SILVER BURDETT PUBLISHER						
1. Science: Understanding Your Environment	26	1	30	1	18	1
2. General Science	0	0	1	0	1	0
e. GLOBE BOOK COMPANY, INC.						
1. Pathways in Science: Chemistry	0	0	0	0	15	0
2. : Life	0	0	0	0	12	0
3. : Earth	0	0	0	0	10	0
4. : Physics	0	0	1	0	16	0
f. HARCOURT BRACE JOVANOVICH						
1. Concepts in Science	39	6	46	6	38	4
2. Matter: An Earth Science	2	0	1	0	6	3
3. Energy: A Physical Science	1	0	0	0	13	1
4. Life: A Biological Science	0	0	0	0	22	3
g. D. C. HEATH AND COMPANY						
1. Heath Science	15	1	26	1	15	1
h. HOLT, RINEHART & WINSTON						
1. Holt Elementary Science	36	2	41	3	24	1
2. Holt Life Science	1	0	2	0	24	1
3. Holt Physical Science	0	0	1	0	21	0
4. Holt Earth Science	0	0	0	0	7	0
5. Holt General Science	0	0	0	0	5	0
i. HOUGHTON MIFFLIN						
1. Modular Activities Program in Science	2	1	2	0	1	0
2. Houghton Mifflin Science	3	0	3	0	1	0
3. Spaceship Earth: Earth Science	0	0	0	0	1	0
4. Life Science	0	0	0	0	4	0
5. Physical Science	0	0	0	0	4	0

	Primary (K-2)		Inter. (3-5)		Upper (6-8)	
	Public	Ind.	Public	Ind.	Public	Ind.
j. LAIDLAW BROTHERS						
1. The New Exploring Science Program	10	3	19	4	14	3
2. Experiences in Life-Science	0	0	0	1	3	5
3. Experiences in Earth-Space Science	0	0	0	0	5	5
4. Experiences in Physical Science	0	0	1	0	3	2
k. McGRAW-HILL WEBSTER DIVISION						
1. Gateway to Science	8	1	9	0	4	0
2. People, Concepts, Processes Science	1	0	1	0	0	0
3. Challenges to Science: General Science	0	0	0	0	0	0
4. : Earth Science	0	0	0	0	0	0
5. : Life Science	0	0	0	0	0	0
6. : Physical Science	0	0	0	0	0	0
l. CHARLES E. MERRILL PUBLISHING CO.						
1. Accent on Science (1983)	30	1	37	1	26	1
2. Principles of Science: Book I	2	0	1	0	24	0
3. : Book II	0	0	2	0	24	0
4. Focus on: Life Science	1	0	2	0	25	0
5. : Earth Science	0	0	1	0	15	0
6. : Physical Science	0	0	1	0	21	0
m. PRENTICE-HALL, INC.						
1. Prentice-Hall: Life Science	0	0	0	0	4	1
2. : Earth Science	0	0	0	0	2	0
3. : Physical Science	0	0	0	0	11	0
n. SCOTT, FORESMAN AND CO.						
1. Scott, Foresman Science	4	1	6	1	3	0
2. Life Science	0	0	0	0	5	1
3. Physical Science	0	0	0	0	5	1
4. Earth Science	0	0	0	0	5	0
o. SILVER BURDETT CO.						
1. Science: Understanding Your Environment	27	1	32	2	23	1
2. Life Science	0	0	0	0	3	0
3. Physical Science	0	0	0	0	3	0
4. Earth Science	0	0	0	0	2	0
5. Science (1984)	0	0	0	0	1	0
p. OTHER						
	23	5	28	7	35	8

B. Text Book Updating: Average time between changes in science texts.

Public: Every 5.9 years

Independent: Every 5.2 years

III. FINANCING/BUDGETING

	Public	Independent
A. Average budget for school science supplies and equipment (excluding salaries and texts)	$6,739	$5,004
B. Average per pupil expenditure for science	$2.14	$0.66
C. How has amount spent on science changed over the past 3 years: (% reporting)		
Increased:	46.9%	78.3%
Decreased:	12.0%	8.7%
Remained the same:	41.1%	13.0%
TOTAL:	100.0%	100.0%

IV. TIME AND SCHEDULING

Average minutes per week teaching science in each grade level compared to nationally recommended times.

	Public	Independent	Recommended		Public	Independent	Recommended
K =	29	36	50	5 =	121	113	150
1 =	64	52	75	6 =	150	116	150
2 =	69	56	75	7 =	211	121	225
3 =	83	67	100	8 =	212	129	225
4 =	98	77	100				

V. SCIENCE LABORATORY ACTIVITIES

	Public	Independent
A. Does program include hands-on activities?		
Yes:	84.3%	89.3%
No:	15.7%	10.7%
TOTAL:	100.0%	100.0%

	Public	Independent
B. If yes, approximately how often?		
At least once a week:	59.5%	56.7%
At least once a month:	32.5%	30.4%
Several times a year:	8.0%	13.1%
TOTAL:	100.0%	100.0%

VI. SCIENCE ENRICHMENT ACTIVITIES

Enrichment activities listed in order of use (most frequent first)

Public	Independent
1. Museum trips	1. Museum trips
2. Guest speakers	2. Guest speakers
3. Visit a zoo	3. Visit a zoo
4. Outdoor program off campus	4. Science fair
5. Science fair	5. Outdoor program off campus
6. Outdoor instructional program	6. Outdoor instructional program

VII. SAFETY

		Public	Independent
A. Is there a formal instructional program on science safety			
for staff?	Yes:	34.4%	17.4%
	No:	65.6%	82.6%
for students?	Yes:	70.4%	54.2%
	No:	29.6%	45.8%
B. Has the Board of Education adopted a policy on science safety?			
	Yes:	40.3%	23.1%
	No:	59.7%	76.9%

VIII. FULL OR PART-TIME SCIENCE RESOURCE PERSON

	Public	Independent
Does the district/school have a full or part-time science resource person?		
Yes:	43.1%	28.6%
No:	56.9%	71.4%

IX. MISCELLANEOUS

	Public	Independent
A. 1. Average number of computers available to school:	8.8	5.8
2. Average number of computers used in science:	3.6 or 41.0%	1.9 or 32.8%
B. 1. Does school provide teacher time to attend conventions, seminars and workshops?		
Yes:	92.0%	84.0%
No:	8.0%	16.0%
TOTAL:	100.0%	100.0%
2. Are teacher expenses reimbursed?		
Always:	71.3%	71.4%
Sometimes:	24.4%	23.8%
Never:	4.3%	4.8%
TOTAL:	100.0%	100.0%
3. If yes, approximately what percentage of the teacher's expenses are reimbursed?		
100%:	84.2%	66.7%
75%:	10.4%	22.3%
50%:	3.7%	5.5%
25%:	1.7%	5.5%
TOTAL:	100.0%	100.0%

C. What type of special in-house science facilities are used in your program? Listed in order of frequency (most frequent first)

Public	Independent
1. Science supply storeroom	1. Science supply storeroom
2. Science lab with utilities	2. Science resource room
3. Facilities for animal care	3. Facilities for animal care
4. Separate chemical storage area	4. Science lab with utilities
5. Outdoor education area	5. Separate chemical storage area
6. Science resource room	6. Teacher lab prep area
7. Teacher lab prep area	7. Outdoor education area
8. Greenhouse	8. Greenhouse
9. Planetarium	9. Planetarium

D. Problems adversely affecting science curriculum

Public:

Rank	Problem	% of respondants ranking problem in 1st place
1	Overemphasis on other subject areas	37.3%
2	Lack of science specialist	21.8%
3	Lack of adequate facilities	21.0%
4	Decreasing enrollment	11.5%
5	Lack of science supplies & equipment	8.4%
		100.0%

Independent:

1	Lack of adequate facilities	47.4%
2	Lack of science specialist	26.3%
3	Overemphasis on other subject areas	21.1%
4	Lack of science supplies & equipment	5.2%
5	Decreasing enrollment	0
		100.0%